Payload Planning System (PPS)

Technical Overview

Flight Projects Directorate

Ground Systems Department

Mission Support Systems Group (FD42)

National Aeronautics and
Space Administration
George C. Marshall Space Flight Center

Overview

- **PPS is a software system used to create ground and onboard planning products which manage the execution of ISS payload activities. It supports the following ISS activities:**
  - **Electronic collection of payload planning requirements (Planning Data Set)**
  - **Utilization Operations Feasibility Assessments**
  - **Pre-increment planning and preparation**
  - **Increment operations**
    - » **Short term planning**
    - » **Realtime planning & replanning**
    - » **Plan execution**

- **The PPS software is used by:**
  - **POIC Cadre (aka POIF), both within the POIC and in office environment**
  - **Payload user community (including Telescience Support Centers (TSC's) and remote Principal Investigator (PI) sites)**
  - **International Partners (IP) and Participants (ESA, NASDA, RSA, CSA, ASI)**

PPS Technical Overview
General

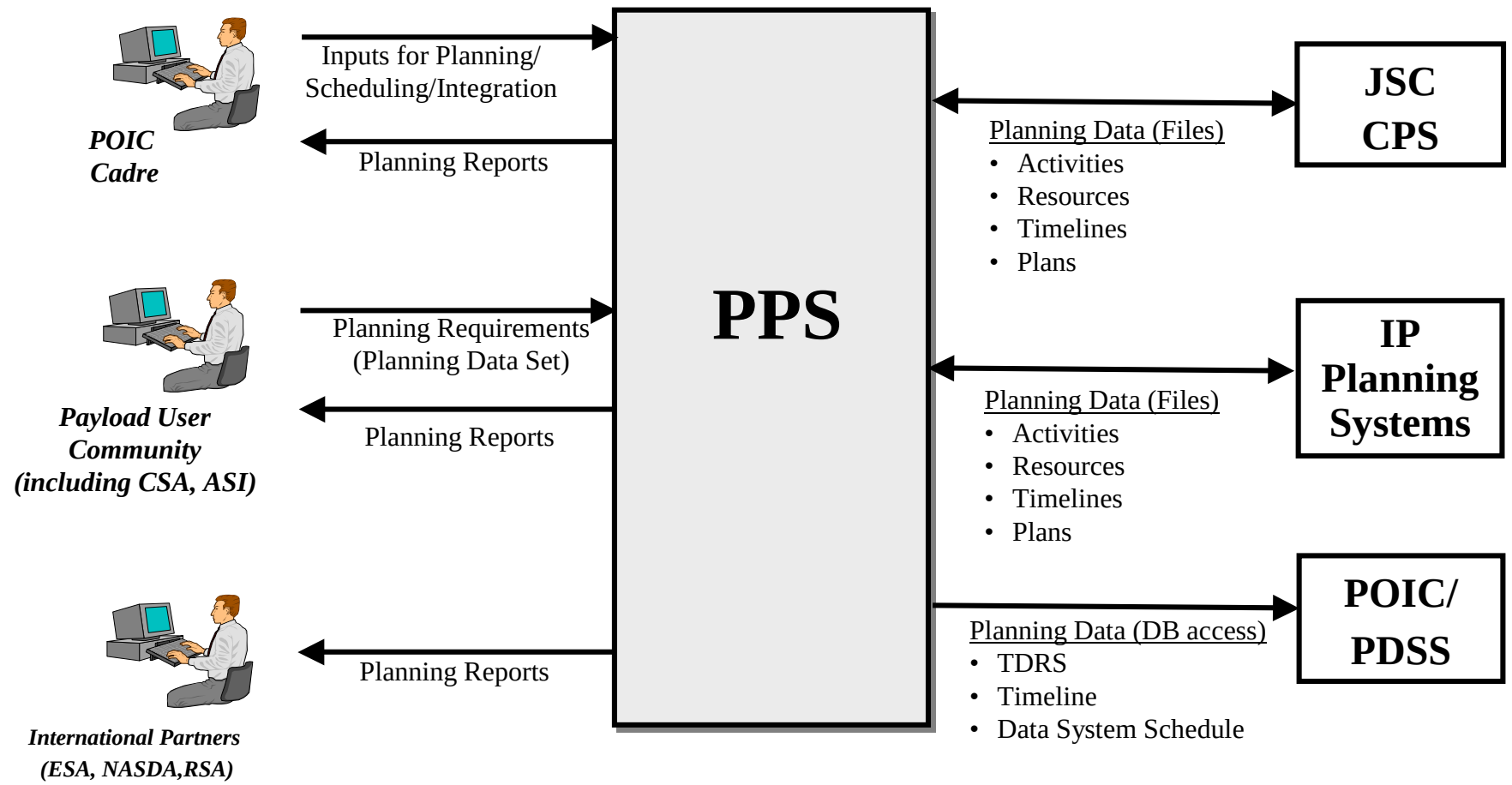
- **The current PPS system is comprised of 7 components (6 software applications and 1 utility)**

- **PPS environment is complex**
  - **Developers: Boeing (MSFC), Lockheed-Martin (JSC), MSFC/FD42**
  - **Languages: C, C++, FORTRAN, JAVA, PL/SQL, X-Windows Motif**
  - **Platforms: DEC Alpha OpenVMS, IBM RS/6000 AIX, Windows 2000 Web servers**
  - **Databases: Multiple Oracle databases, plus files**
  - **Users: POIC Cadre, payload user community, International Partners and Participants - ESA, NASDA, RSA, CSA, ASI**
  - **Interfaces: POIC/PDSS, JSC Consolidated Planning System (CPS), International Partner planning systems (RSA, NASDA, ESA)**

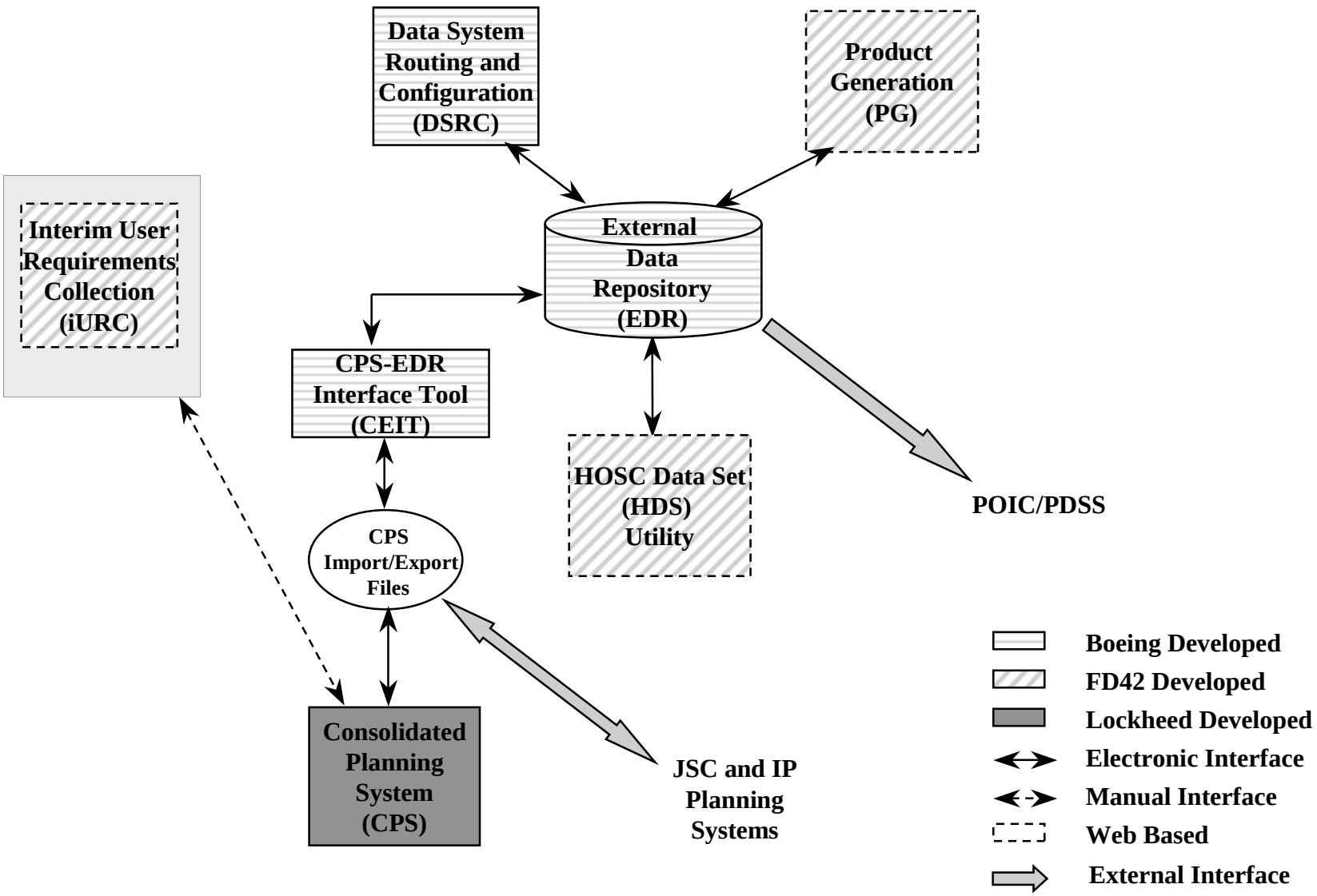
- **MSFC/FD42 performed the overall PPS system integration**

- **PPS is hosted in the HOSC as part of the POIC**

PPS Technical Overview
Interfaces and Products



PPS Technical Overview
Software Architecture



PPS Technical Overview
Component Descriptions

Component Description & Major Capabilities	Used by POIC Cadre	Used by Payload Users	Used by IP's
External Data Repository (EDR): The central PPS database which supports the exchange of planning data between components. Also provides the interface for external applications to access planning data. • PL/SQL stored procedures for accessing EDR data • User interface for managing the data in the EDR	X		
Interim User Requirements Collection (iURC): Provides interim capabilities for the collection of user planning requirements prior to the operational readiness of URC. • Web interface for defining Activities and Sequences to be planned/scheduled (Planning Data Set, as defined in the Payload Data Sets Blank Book) • Web user interface for viewing, manipulating, and verifying requirements data • Reports of submitted requirements	X	X	
User Requirements Collection (URC): Provides capabilities required to collect and define the inputs to the planning/scheduling process. • Web user interface for defining resources & constraints to be planned against • Web user interface for defining Activities and Sequences to be planned/scheduled (Planning Data Set, as defined in the Payload Data Sets Blank Book) • Web user interface for viewing, manipulating, and verifying requirements data • Transformation of user inputs into format required by other PPS components • Reports of submitted requirements	X	X	

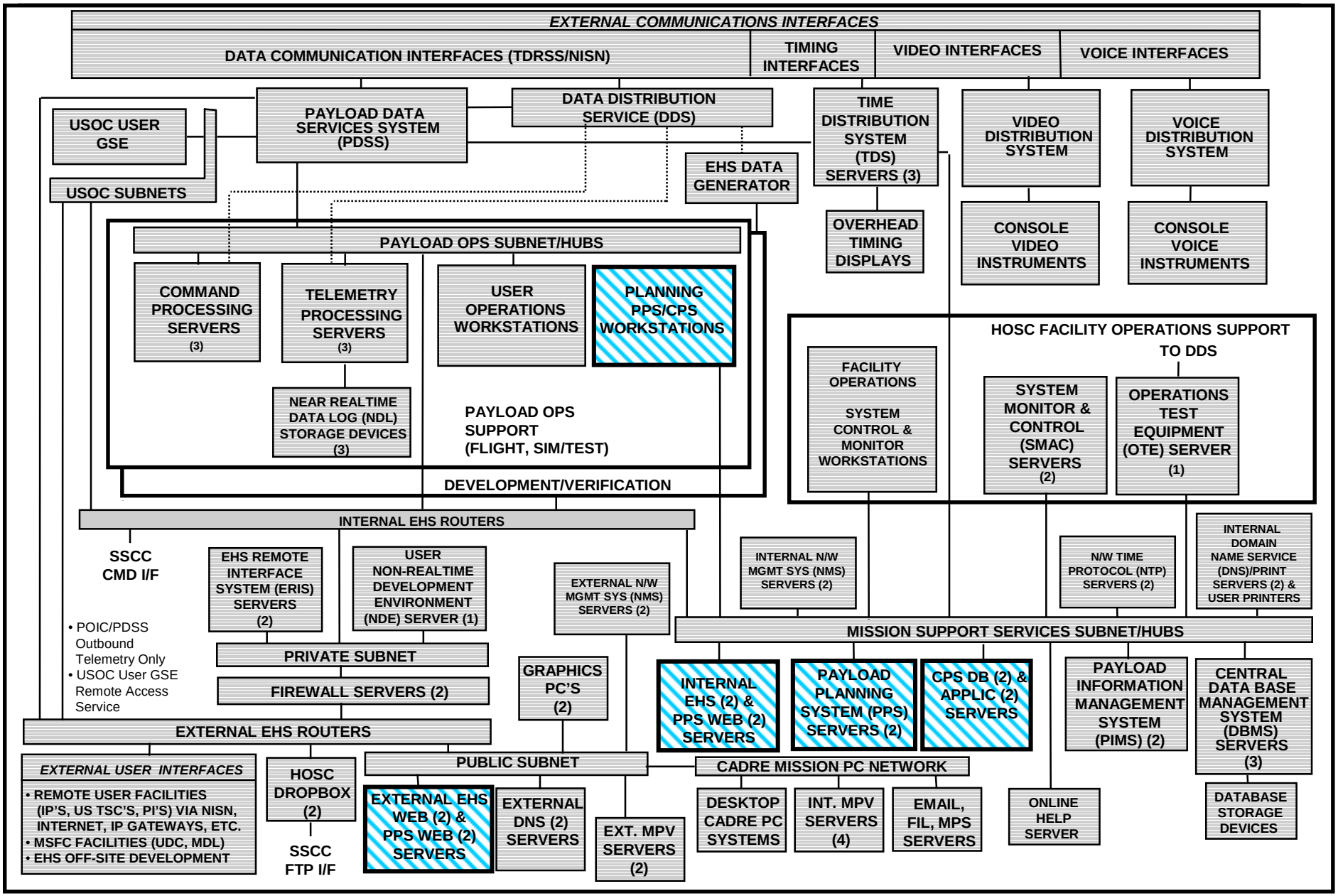
PPS Technical Overview
Component Descriptions (cont.)

Component Description & Major Capabilities	Used by POIC Cadre	Used by Payload Users	Used by IP's
Consolidated Planning System(CPS): Provides capabilities required to develop the detailed timeline/Short Term Plan and the Onboard Short Term Plan (OSTP) • Automated capabilities for scheduling Activities and Sequences within identified resources and constraints • Capabilities for integrating and editing timelines • Ability to generate an OSTP from a timeline • User interface for viewing, manipulating, and verifying timeline data	X		
CPS-to-EDR Interface Tool (CEIT): Provides the capabilities required to move PPS data between the CPS import/export files and the EDR database. • Transforms CPS formatted data into EDR formats and populates EDR database • Transforms EDR formatted data into CPS formats and creates CPS import/export files	X		
Data System Routing and Configuration (DSRC): Provides capabilities required to schedule data routing and data system configurations. • Automated capabilities for scheduling data routing through onboard data systems, based on requirements in timeline and constraints of data systems • Capabilities for editing data system schedules • User interface for viewing, manipulating, and verifying data system schedules	X		

PPS Technical Overview
Component Descriptions (cont.)

Component Description & Major Capabilities	Used by POIC Cadre	Used by Payload Users	Used by IP's
Product Generation (PG): Provides capabilities for POIC cadre, payload users, and others to view and print planning data. During increment operations, provides access to most current plans and schedules. • Standard reports needed by payload community, such as Data Flow Plan, Payload Activity Plan, and On-orbit Operations Summary, with some report customization • Web user interface for selecting, tailoring, and viewing desired reports	X	X	X
HOSC Data Set (HDS) Utility: Small utility program required to implement the electronic interface between PPS and the POIC/PDSS. • Creates file (HOSC data set) containing pointers to specific data in EDR which is needed by POIC/PDSS software • Web user interface for managing file creation	X		

PPS Technical Overview
PPS Hosting in HOSC



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